THE MILITARY EFFECTIVENESS OF NAVY AIRMEN ENLISTEES

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NEUROPSYCHIATRIC RESEARCH UNIT

SAN DIEGO, CALIFORNIA 92152

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Introduction[1,2,3]

During the past decade the Navy's Neuropsychiatric Research Unit has conducted a series of longitudinal studies of the military effectiveness of Navy enlisted personnel (Plag, 1964; Plag and Goffman, 1966a; Plag and Goffman, 1966b; Plag and Goffman, 1966c; Plag and Goffman, 1968). These studies have yielded findings regarding the incidence of non-effectiveness and have been successful in identifying some personal history and early training characteristics of enlistees which are related to their military adaptations during the four years of active duty comprising their first enlistments.

The findings from these studies have made it possible to derive formulae which are useful for predicting enlistee effectiveness. Sailors are considered to have rendered effective military service if they complete their tours of obligated duty and are recommended for reenlistment by their commanding officers. Non-effective sailors are those discharged prior to completion of their tours of active duty and ones completing their tours with performances so poor that they are not recommended for reenlistment. The accuracy with which effectiveness predictions can be made are quite modest. In a general sense, the goal of additional studies in the area of enlistee effectiveness is to improve the accuracy with which forecasts can be made.

More specifically, the studies of enlistee effectiveness which have been conducted to date have concentrated upon identifying valid predictor composites. In other words, the focus in these studies has been upon the predictor aspects of the predictor-criterion equation, not upon refinements in the effectiveness criterion itself. An evaluation of criterion reliability, measurement innovations aimed at increasing criterion variability, and an assessment of the value of criterion moderators are examples of criterion studies needed in the area of enlistee-effectiveness research. This report is of one study designed to evaluate what moderating effect, if any, enlistee membership in a specific group might have upon the validity of effectiveness predictions.

The physical and psychological environments in which enlistees serve in the

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[2]The opinions expressed are those of the authors and are not to be construed as necessarily reflecting the official policy of the naval service.

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fleet are extremely varied. It would seem reasonable, therefore, to hypothesize the existence of differential rates of effectiveness as a function of different service environments. It is also quite possible that those variables which are predictive of effectiveness for all enlistees together are different from those which are most valid for predicting effectiveness for enlistees assigned to a specific fleet environment.

There are several different bases upon which fleet environments can be categorized. In this study, groupings were made on the basis of broad occupational fields which comprise the enlisted rating structure. In addition to the general rates, NAVPERS 18068B defines twelve occupational groups: (1) Deck, (2) Ordnance, (3) Electronics, (4) Precision Equipment, (5) Administrative and Clerical, (6) Miscellaneous, (7) Engineering and Hull, (8) Construction, (9) Aviation, (10) Medical, (11) Dental, and (12) Steward. Group IX - Aviation, and enlistees in the general rating of Airman (AN), constituted the group selected for this study.

In addition to the general purpose of the study, as outlined in the foregoing paragraphs, the specific plan of the investigation included a comparison of airmen and non-airmen on the basis of (a) personal history characteristics, (b) percentages and types of service non-effectiveness, (c) percentage of personnel reenlisted, and (d) percentage of personnel assigned to Class A service schools following graduation from recruit training. A determination was also made of the number of airmen who originally enlisted in the Navy in airmen ratings, and a sampling was made of the types and number of duty stations to which airmen are assigned during their first enlistments. Finally, equations were derived for predicting the service effectiveness of airmen and non-airmen groups separately, and a comparison was made of the validities of these independent predictions.

The Research Data

Subjects for this study consisted of enlistees who began their tours of active duty at the two Naval Training Centers at Great Lakes and San Diego during four sampling periods in May, August, and November 1960 and February 1961. Aviation personnel were defined as those recruit training graduates assigned to the following ratings:

(1) Airman (AN)

(2) Aerographer's Mate (AG)

(3) Air Controlman (AC)

(4) Aviation Antisubmarine Warfare Operator (AW)

(5) Aviation Antisubmarine Warfare Technician (AX)

(6) Aviation Boatswain's Mate (AB)

(7) Aviation Electrician's Mate (AE)

(8) Aviation Electronics Technician (AT)

(9) Aviation Fire Control Technician (AQ)

(10) Aviation Machinist's Mate (AD)

(11) Aviation Maintenance Administrationman (AZ)

(12) Aviation Ordnanceman (AO)

(13) Aviation Storekeeper (AK)

(14) Aviation Structural Mechanic (AM)

(15) Aviation Support Equipment Technician (AS)

(16) Aircrew Survival Equipmentman (PR)

(17) Photographer's Mate (PH)

(18) Photographic Intelligenceman (PT)

(19) Tradewman (TD)

Non-airmen consisted of those recruit training graduates assigned to ratings other than the nineteen listed above.

Biographical data for the sample subjects were obtained from a psychiatric screening questionnaire which is routinely administered to enlisted personnel during their first day in recruit training. These data consisted of the following variables:

(1) Age at enlistment

(2) Years of formal education completed

(3) Number of arrests - for reasons other than traffic violations

(4) Family stability - the marital status of parents at the time of sailor's enlistment

(5) Number of school grades failed or repeated

(6) Number of expulsions or suspensions from school

(7) Average grade received in school

(8) Age upon leaving school

(9) Period of active duty obligation

(10) Number of siblings

(11) History of prior service rejection

(12) Marital status

(13) History of previous service

(14) Religion

(15) Race

Subjects' scores on five tests of cognitive ability were obtained from records maintained by the classification departments at the two naval training centers. These tests were:

(1) Armed Forces Qualification Test (AFQT) - a test of mental ability administered to all applicants for service induction and enlistment

at the Armed Forces Examining and Entrance Stations

(2) General Classification Test (GCT) - a 100-item Navy test of verbal aptitude

(3) Arithmetic Test (ARI) - a 50-item Navy test of the ability to perform elementary computations and solve quantitative problems

(4) Mechanical Test (MECH) - a 100-item Navy test of mechanical comprehension and tool knowledge

(5) Clerical Test (CLER) - a 210-item Navy speeded test of number matching

Data pertaining to the adjustment and performance of enlistees during recruit training were obtained from files maintained by the training offices of each of the two recruit training commands. These data were the following:

(1) Number of recruit training transfers - because of performance deficiencies or because of physical illness, recruits may be set back in training or transferred to other training companies. This variable was a measure of the number of times recruits were transferred from one training unit to another.

(2) Company commander rating of performance - a three-category scale (best ten recruits, average recruits, worst ten recruits) of overall training performance as evaluated by company commanders at the termination of training. Only those subjects who completed training with their originally assigned companies received a score on this variable. In the data analyses, therefore, recruit training variables 1 and 2 were combined and treated as a single predictor.

(3) Average weekly test grade - an average of the scores received by recruits on weekly tests measuring knowledge of classroom subjects taught during training

(4) Recruit final achievement test score (RFATS) - a score based upon a final examination covering subjects taught during recruit training

(5) Recruit disciplinary status - a variable specifying various types of disciplinary action at the regimental level during training

Throughout the period from 1960 through 1965, the record (Enlisted Master Tape) of active duty enlistees, maintained by the Bureau of Naval Personnel, was examined periodically in order to construct a history of the commands to which the sample subjects had been attached. In addition, the Enlisted Master Tape served as a source of information for determining which subjects had failed to complete their active duty obligations. For those personnel who did not extend their enlistments beyond the first, data pertaining to the cause of separation, the periods of duty served, and commanding officer recommendations for reenlistment were obtained from

DD Form 214N of their service records.

Results

Sample: The total research sample numbered 11,008 sailors. Of this group, 639 personnel were separated from service while attached to recruit training commands. Of the 10,369 subjects who graduated from recruit training, 2358 were assigned to aviation ratings, while the remaining 8011 enlistees were assigned to other-than-aviation specialties. It is interesting to note that of the 2358 aviation personnel, 1153 (48.88 percent) entered recruit training already classified as airmen (AR=590,AA=553,AN=10). The remainder (1205) were assigned to aviation specialties at the time of classification processing in recruit training.

Effectiveness: Military effectiveness has been defined as the completion of obligated duty with a recommendation for reenlistment. Non-effectiveness refers to unsatisfactory performance as evidenced by service separation prior to the completion of obligated duty or failure to be recommended for reenlistment. A small, but statistically significant difference was found in the rate of military effectiveness between the airmen and non-airmen groups. For the airmen, 78.91 percent were found to have rendered effective service, while for non-airmen the percentage was 76.85.

Table 1 shows the number of subjects in the two groups who rendered various types of non-effective service. These data may be summarized as follows:

(1) Airmen have a higher rate of military effectiveness than non-airmen.

(2) Some subjects in both groups render performances which, because of service incurred physical disability or death, can be categorized as neither effective nor non-effective. There is no significant difference between the airmen and non-airmen groups on this basis.

(3) Of those subjects who render non-effective performances, there is no significant difference between the airmen and non-airmen groups in the percentage who receive early separations versus the percentage who complete their tours but are not recommended for reenlistment.

(4) Of those personnel who render non-effective performances as evidenced by early service separation, significant differences exist between airmen and non-airmen on the basis of the type of discharge received. Airmen receive a significantly larger number of punitive discharges and a significantly smaller number of unsuitability discharges than non-airmen.

Reenlistment: Only those personnel who complete their periods of active obligated duty and are recommended for reenlistment by their commanding officers are eligible for a second enlistment. For the airmen group, the number eligible for reenlistment was 1830, while for the non-airmen the number was 6052. Airmen reen-

Table 1

Numbers of Airmen and Non-Airmen Rendering Various Types of Non-Effective Service

	Category	Airmen No.	Airmen Percent	Non-Airmen No.	Non-Airmen Percent	Difference
I.	Total subjects	2358	100.00	8011	100.00	X^2=0.002
	A. Missing data	11	0.47	38	0.47	df=1
	B. Complete data	2347	99.53	7973	99.53	p=Not Signif.
II.	Subjects-complete data	2347	100.00	7973	100.00	X^2=0.020
	A. Effective or non-effective	2319	98.81	7875	98.77	df=1
	B. Neither effective nor non-effective	28	1.19	98	1.23	p=Not Signif.
	1. Service incurred physical disability	13		69		
	2. Death	15		29		
III.	Subjects effective or non-effective	2319	100.00	7875	100.00	X^2=4.346 df=1
	A. Effective-completed tour, recomm. for reenlist.	1830	78.91	6052	76.85	p=.04
	B. Non-effective	489	21.09	1823	23.15	
IV.	Subjects non-effective	489	100.00	1823	100.00	X^2=0.964
	A. Early separation	325	66.46	1254	68.79	df=1
	B. Completed tour but not recomm. for reenlist.	164	33.54	569	31.21	p=Not Signif.
V.	Subjects non-effective by reason of early separation	325	100.00	1254	100.00	
	A. Medical (EPTE)[a]	31	9.54	99	7.89	X^2=0.922;df=1;N.S.
	B. Unsuitability	73	22.46	373	29.74	X^2=6.756;df=1;p<.01
	C. Unfitness	86	26.46	377	30.06	X^2=1.617;df=1;N.S.
	D. Punitive	73	22.46	209	16.67	X^2=5.911;df=1;p=.02
	E. Administrative (C.O.G.)[b]	62	19.08	196	15.63	X^2=2.245;df=1;N.S.

[a]Existed prior to service entry
[b]Convenience of Government

listees numbered 378, or 20.66 percent of those eligible. In the non-airmen group, 1293 personnel (21.36 percent) reenlisted. The difference between the two groups in reenlistment rate is not statistically significant (X^2=0.423; df=1; p=N.S.).

School Attendance: There was no significant difference between the percentage of airmen and the percentage of non-airmen who attended a Class A service school following graduation from recruit training. 38.53 percent of the airmen and 38.38 percent of the non-airmen attended Class A schools.

Career History: As an example of the types of commands to which airmen are attached during their first enlistment, a sub-sample of twenty subjects was randomly selected from the airmen group and a listing made of their duty stations and the time spent at each. Rate changes during the course of the first enlistment were also noted for each subject. The career histories of these airmen are shown in Table 2.

Table 2

The Career Histories of a Sample of Twenty Airmen

Subject	Successive Duty Stations[a]	Time Attached (in days)	Rate Progression[b]
1	School, NATTU, JACKSONVILLE Naval Station, KEFLAVIK VAW 12	234 362 429	AA, AEAA, AEAN, AE3
2	NATTU, PENSACOLA Discharged, BuPers Code 368, Unsuitability, Anti-social Personality	289	AA,AR
3	NAAS, KINGSTON, TEX. VAH 1	713 517	AA,AR, AA
4	CVA 59, FORRESTAL	1301	AA,AN, ABH3
5	School, NATTC, MEMPHIS NAF, MONTEREY	119 1217	AA,ADJAN, ADJ3
6	AIRMAINT TRAGRP VS 30 VS 36	916 30 386	AA,AN, ADR3, ADR2
7	TRARON 6 TRARON 3 NAS, MAYPORT, FLA. RS, NORFOLK, VA.	521 256 31 243	AA, AN, AA
8	School, NATTC, MEMPHIS AEW, BARRONPAC VW 1 VA 125 VA 153	254 104 412 69 363	AA, ATRAN, ATR3
9	NAS, NORFOLK CVA 34, ORISKANY	737 543	AA,AN, ADR3, ADRAN
10	MISSLCEN, PT.MAGU PMA NAS, PT.MAGU NSD, GUAM	291 457 596	AA,AN, AKAN, AK3
11	School, NATTC, MEMPHIS VS 32	321 773	AA,AN, ATSAN,ATS3, AX3,AX2
12	CVS 11, INTREPID LPH7, GUADALCANAL	858 554	AA,AN, ADR3,ADRAN
13	NAS, LEMOORE Discharged, BuPers Code 28F, Unfitness,Failure to pay debts	558	AA,AN
14	School, TRADEV CTR, PENSACOLA VU 7	250 1063	AA,YAEAN, AE3
15	TRARON 6 School, NATTC, MEMPHIS VA 165	149 129 1158	AA,AN, AMEAN, AME3,AME2

[a]For each subject, duty stations are listed in order - from recruit training graduation to completion of enlistment.

[b]Rate progression is the order in which rates were held by each subject from recruit training graduation until the end of the enlistment. They do not correspond in time to the subject's duty stations.

Table 2 (Continued)

Subject	Successive Duty Stations[a]	Time Attached (in days)	Rate Progression[b]
16	NAF, MONTEREY	663	AA,
	CVS 33, KEARSARGE	316	AN
17	School, NATTC, MEMPHIS	170	AA,
	NS, ARGENTIA	619	ADRAN,
	VAW 33	465	ADR3
18	PAC MISSLE RANGE	723	AA,AR,
	CVA 41, MIDWAY	612	AA,AN
19	AV 13, SALISBURY	389	AA,AN
	Discharged, BuPers Code 28B, Unfitness,Discreditable Involvement with Civilian or Military Authorities		
20	School, NATTC, MEMPHIS	151	AA,
	NS, SAN DIEGO	27	AMHAA,
	VAP 61	543	AMHAN,
	VAH 123	49	AMH3,
	VAH 8	533	AMH2

Although data for only twenty subjects may be quite unreliable, the information contained in Table 2 suggests that airmen who complete their first enlistments are attached to an average of 2.7 commands. The average number of days spent at each duty station is 461. For those subjects who attend a service school, an average of 204 days is spent in the classroom during the enlistment. For the subjects in this sample who completed their enlistments,the average number of days spent on active duty form the time of graduation from recruit training until termination of their obligation was 1249 days.

Personal History Characteristics: Airmen and non-airmen were compared on the basis of fifteen personal history characteristics and five tests of cognitive ability. Statistically significant differences were found between the airmen and non-airmen groups on nine of these variables. Table 3 depicts these variables and the differences found between the groups. On the basis of these data, airmen may be described as possessing higher average intelligence than non-airmen and as having a higher percentage of their members belonging to the Caucasian-Protestant group of enlistees. More airmen than non-airmen give a history of prior military service which is consistent with the finding that 48.88 percent of the aviation personnel entered recruit training already classified as airmen.

Prediction of Effectiveness: The variables which were analyzed for use in predicting service effectiveness were those listed in "The Research Data" section of this report. They consisted of fifteen biographical characteristics, five tests of cognitive ability, and four measures of recruit training performance.

Table 3

Personal History Characteristics and Tests of Cognitive Ability on which Airmen and Non-Airmen are Significantly Different

Part I - Continuous Variables

	Variable	Mean for Airmen	Mean for Non-Airmen	Difference
1.	Number of Siblings	3.119	3.250	t=2.60;p<.01
2.	AFQT Score (Navy Standard Score Equivalent)	52.55	51.17	t=7.56;p<.001
3.	GCT Score	51.91	50.82	t=5.13;p<.001
4.	ARI Score	50.86	50.34	t=2.89;p<.01
5.	MECH Score	51.44	49.67	t=9.77;p<.001

Part II - Discrete Variables

	Variable	Percent of Airmen	Percent of Non-Airmen	Difference
6.	Marital Status			X^2=5.58
	a. Single	96.18	97.14	df=1
	b. Other	3.82	2.86	p=.02
7.	Previous Service			X^2=11.99
	a. None	90.83	93.04	df=1
	b. Some	9.17	6.96	p<.001
8.	Religion			X^2=5.96
	a. Protestant	71.33	68.82	df=2
	b. Catholic	27.30	29.45	p=.05
	c. Other	1.37	1.73	
9.	Race			X^2=9.29
	a. Caucasian	96.09	94.51	df=1
	b. Other	3.91	5.49	p<.01

Two equations were derived for the prediction of effectiveness, one for the airmen group and one for the non-airmen group. For the purpose of obtaining an estimate of the predictive validity of the derived equations, each of the enlistee groups was divided into a validation and cross-validation sample. The validation and cross-validation samples were selected in such a way that the precentages of effective and non-effective enlistees in the two samples were identical.

For each group (airmen and non-airmen), the predictor data from the validation sample were analyzed to determine the linearity of the predictor-criterion relationships and for the purpose of assigning appropriate weights to the various segments of the discrete variables. Pearson product-moment correlations were then calculated between all variables, and a stepwise linear multiple regression proce-

dure was utilized for deriving the prediction equation for each of the subject groups. In each case, the optimum prediction equation which was derived was one in which all the beta weights of the independent variables were significant at or beyond the .05 level of confidence. The derived equation for each group was then applied to the cross-validation sample and predicted criterion scores calculated for each subject. These scores, from the cross-validation sample, were then correlated with the effectiveness criterion and the resulting Pearson r interpreted as representing the predictive validity of the aggregate of enlistee characteristics.

Of the 2319 airmen for whom effectiveness data were available, 1160 were assigned to the validation sample and 1159 to the cross-validation sample. For both samples, the percentage of effectiveness was 78.91.

Of the 24 predictor variables which were analyzed in the airmen validation sample, only 17 yielded correlations significantly related to the effectiveness criterion. Those yielding insignificant correlations were: (1) Family stability, (2) Number of siblings, (3) History of previous service, (4) History of prior service rejection, (5) Marital status, (6) Religion, and (7) Race. These seven variables were omitted from the multiple regression analysis.

The correlations of the 17 valid predictors and the criterion are shown in Table 4. It will be noted in Table 4 that all the predictor validities are positive, even though some of the variables obviously bear a negative relationship to military effectiveness (e.g.,school grades failed). This situation occurs because of the linearization weights which were assigned to the segments of some of the variables-- ones which otherwise would not be linearly related to the criterion. Actually, the weights assigned to the various segments of each variable are the criterion means for the subjects comprising the variable categories. Enlistees rendering effective service were assigned a value of "1" on the criterion variable, while those who were non-effective were assigned a value of "0".

An example may serve to illustrate the weighting procedure. The "school grades failed" variable was represented in three segments: none, one, and two or more. The criterion means for subjects in these categories were found to be .844, .746, and .648, respectively. In other words, 84.4 percent of airmen in the validation sample who failed no grades were effective, while 74.6 percent and 64.8 percent of airmen who failed one and two or more grades, respectively, were effective. Table 5 shows the weights assigned to the various segments of the predictor variables for the airmen group.

The number of non-airmen who were either effective or non-effective was 7875. Of these, 3937 comprised the validation sample and the cross-validation sample numbered 3938.

Table 4[a,b]

Product-Moment Correlations of Predictors Significantly Related to Military Effectiveness - Airmen Group - Validation Sample (N=1160)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Effectiveness																	
2. Age	113																
3. Active Duty Ob.	149	669															
4. Education	275	376	401														
5. School Grds. Failed	164	122	098	476													
6. School Grade Av.	145	118	160	274	185												
7. Age left School	193	432	489	633	125	171											
8. No. Expulsions	164	173	151	206	111	120	157										
9. No. Arrests	134	084	096	192	058	086	163	259									
10. AFQT	179	145	073	320	255	210	169	049	057								
11. GCT	182	121	030	380	296	200	201	030	042	653							
12. ARI	226	099	057	393	285	329	215	061	068	573	594						
13. MECH	092	141	010	135	124	039	114	060	040	544	386	239					
14. CLER	151	102	067	245	154	146	129	115	043	147	144	291	058				
15. R.T. Transfers-C.C. Rating	256	171	123	238	163	136	157	138	048	138	147	154	122	152			
16. Aver. Weekly Test Grade	214	156	091	369	288	201	187	044	045	510	629	484	345	231	231		
17. RFATS	143	145	034	246	264	091	126	004	-036	457	509	337	375	121	106	511	
18. R. Discipline Status	092	021	004	055	035	004	045	085	059	-004	-024	024	040	080	.350	044	001

[a]Decimal points have been omitted from the correlations.

[b]Many of the predictor variables were linearized with the effectiveness criterion. Hence, the validities of all the predictors are positive. Refer to Table 5 for the linearization weights assigned to the segments of some of the variables.

Those variables (17 in number) found to be significantly related to effectiveness for arimen were also found to possess significant validities for non-airmen. As with the airmen group, seven of the variables yielded insignificant correlations.

Table 6 shows the correlations of the significant predictors and the criterion for the non-airmen. As in the case of the airmen, some of the predictors were found to possess non-linear relationships with the effectiveness criterion. The weights which were applied to the segments of these variables are shown in Table 7.

The multiple regression analysis of the airmen data identified six variables which added uniquely to the prediction of effectiveness. Arithmetic score, Recruit training transfers - Company commander rating, Education, Expulsions, Arrests, and Average weekly test score were the variables whose beta weights were found to be significant at or beyond the .05 level of confidence. This predictor composite yielded a multiple correlation (in the validation sample) of .379. The cross-validity of the prediction equation was .328, with a standard error of estimate of .3854.

For the non-airmen group, eight variables were identified as the predictor composite. These were Mechanical score, Clerical score, Recruit discipline status, Recruit training transfers - Company commander rating, Education, Expulsions, Arrests, and Average weekly test grade. The multiple correlation of these variables (in the validation sample) was .363. The predictor composite cross-validated with an r of .353, yielding a standard error of estimate of .3949.

The beta weights and the significance levels of the variables comprising the prediction equations for the airmen and non-airmen groups are listed in Table 8.

The difference between the standard error of estimate for airmen and the standard error of estimate for non-airmen is not statistically significant (t=1.016). This indicates that predictions of effectiveness for airmen are no more or less accurate than predictions of effectiveness for non-airmen.

Five of the variables comprising the equation for predicting effectiveness for airmen are the same as those contained in the equation for the non-airmen. Their beta weights are of the same relative magnitude too. This would suggest that assignment to the aviation speciality does not moderate the effectiveness predictions.

As a final check on this conclusion, the equation derived from the validation sample of one group was used to predict effectiveness for the cross-validation sample of the other. If it were found that predictions for both groups were significantly less valid using the equations derived from the validation samples of the alternate group, then it would be reasonable to conclude that assignment to the aviation specialty is a unique contributor to the prediction of effectiveness. The results obtained, however, were these:

Table 5

Linearization Weights Assigned to Segments of Predictor Variables Significantly Related to Effectiveness Criterion - Airmen Group - Validation Sample

	Variable	Segment	Weight Assigned
1.	Age	Treated as Continuous Variable	
2.	Active Duty Obligation	2 years	.864
		3 years (Minority)	.722
		4-6 years	.840
3.	Education	8 years or less	.615
		9-10 years	.678
		11 years	.772
		12 years or more	.907
4.	School Grades Failed	None	.844
		One	.746
		Two or more	.648
5.	School Grade Average	A (4.0)	.958
		B (3.0)	.859
		C or less (2.0-)	.744
6.	Age Left School	13-16 years	.659
		17 years	.798
		18-20 years	.869
		21 years or older	1.000
7.	Number of Expulsions and Suspensions	None	.827
		One	.730
		Two or More	.627
8.	Number of Arrests	None	.816
		One or More	.676
9.	AFQT	Treated as Continuous Variable	
10.	GCT	Treated as Continuous Variable	
11.	ARI	Treated as Continuous Variable	
12.	MECH	Treated as Continuous Variable	
13.	CLER	0-34	.558
		35-49	.773
		50 or Higher	.846
14.	R.T. Transfers - C.C. Rating	0 Transfers, CC Upper Ten	.874
		0 Transfers, CC Average	.830
		[0 Transfers, CC Lower Ten] [1 or 2 Transfers]	.687
		3 or More Transfers	.313
15.	Average Weekly Test Grade	Treated as Continuous Variable	
16.	RFATS	Treated as Continuous Variable	
17.	Recruit Discipline	No	.797
		Yes	.615

Table 6[a,b]

Product-Moment Correlations of Predictors Significantly Related to Military Effectiveness - Non-Airmen Group - Validation Sample (N=3937)

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Effectiveness																	
2.	Age	157																
3.	Active Duty Ob.	144	913															
4.	Education	271	505	450														
5.	School Grds. Failed	111	141	106	477													
6.	School Grade Av.	112	131	118	267	221												
7.	Age left School	199	556	512	632	153	157											
8.	No. Expulsions	175	171	140	205	129	134	163										
9.	No. Arrests	128	094	090	149	032	092	139	240									
10.	AFQT	154	119	096	348	247	182	222	017	011								
11.	GCT	137	134	090	424	319	219	241	031	021	672							
12.	ARI	165	108	067	395	293	276	259	055	060	592	626						
13.	MECH	141	108	068	166	092	029	127	039	-009	567	365	285					
14.	CLER	141	123	097	288	195	131	208	036	050	219	236	373	094				
15.	R.T. Transfers - C.C. Rating	230	169	138	246	165	165	154	104	075	177	199	214	142	162			
16.	Aver. Weekly Test Grade	204	164	123	377	279	216	223	059	036	542	649	501	349	252	327		
17.	RFATS	113	138	100	306	307	120	182	024	-040	480	530	366	370	241	131	515	
18.	R. Discipline Status	140	097	069	114	083	056	099	095	024	044	057	067	061	068	338	110	146

[a]Decimal points have been omitted from the correlations.

[b]The validities of all the predictors are positive because some of the variables have been linearized with the effectiveness criterion. Refer to Table 7 for the weights assigned to the segments of the linearized variables.

Table 7

Linearization Weights Assigned to Segments of Predictor Variables Significantly Related to Effectiveness Criterion - Non-Airmen Group - Validation Sample

	Variable	Segment	Weight Assigned
1.	Age	17 years	.695
		18 years or older	.828
2.	Active Duty Obligation	3 years (Minority)	.699
		2,4, or 6 years	.822
3.	Education	9 years or less	.633
		10 years	.674
		11 years	.729
		12 years or more	.894
4.	School Grades Failed	None	.810
		One	.728
		Two or more	.692
5.	School Grade Average	A-B (4.0-3.0)	.824
		C (2.0)	.755
		D or less (1.0-)	.662
6.	Age Left School	13-16 years	.635
		17 years	.781
		18 years or older	.857
7.	Number of Expulsions and Suspensions	None	.803
		One	.732
		Two-Three	.575
		Four or more	.463
8.	Number of Arrests	None	.793
		One-Two	.694
		Three or more	.486
9.	AFQT	Treated as Continuous Variable	
10.	GCT	Treated as Continuous Variable	
11.	ARI	Treated as Continuous Variable	
12.	MECH	Treated as Continuous Variable	
13.	CLER	0-34	.618
		35-44	.729
		45-49	.766
		50-54	.804
		55 or higher	.860
14.	R.T. Transfers-C.C. Rating	0 Transfers, CC Upper Ten	.880
		0 Transfers, CC Average	.807
		[0 Transfers, CC Lower Ten] [1,2, or 3 Transfers]	.660
		4 Transfers	.415
		5 or More Transfers	.229
15.	Average Weekly Test Grade	Treated as Continuous Variable	
16.	RFATS	Treated as Continuous Variable	

Table 7 (Continued)

Variable	Segment	Weight Assigned
17. Recruit Discipline	None	.782
	Warning	.646
	Action Taken	.483

(a) When the non-airmen equation was used to predict effectiveness for airmen, the r obtained was .338. In contrast, a correlation of only .328 was obtained on cross-validation for airmen using the airmen formula.

(b) When the airmen equation was used to predict effectiveness for non-airmen, an r of .343 was obtained. This was less than the r of .353 obtained by cross-validating the non-airmen equation on the non-airmen group.

In other words, the most valid prediction of effectiveness for both groups was made when the formula derived from the non-airmen sample was utilized. It is probable that this result was obtained because of the larger N-count in the non-airmen group, lending greater stability to the weights of the variables in that equation.

Table 8

Predicted Effectiveness Equations for Airmen and Non-Airmen

Group	Predictor	Beta Weight	Significance	Multiple Correlation	Cross Validity
Airmen	ARI	.1031	p<.01	.379	.328
	R.T. Transfers-C.C. Rating	.1770	p<.001		
	Education	.1378	p<.001		
	Expulsions	.0851	p<.01		
	Arrests	.0670	p=.02		
	Average Weekly Test Grade	.0655	p=.04		
Non-Airmen	MECH	.0670	p<.001	.363	.353
	CLER	.0444	p<.01		
	R. Discipline	.0563	p<.001		
	R.T. Transfers-C.C. Rating	.1216	p<.001		
	Education	.1596	p<.001		
	Expulsions	.1009	p<.001		
	Arrests	.0664	p<.001		
	Average Weekly Test Grade	.0549	p<.01		

Discussion

The major purpose of this investigation was to evaluate whether occupational specialty, at least for airmen, might act as a moderator of the military effectiveness predictions of Navy enlisted personnel. Formulae were derived for forecasting the effectiveness of enlistees in aviation specialties and those not in aviation specialties. Predictions of the effectiveness of airmen were found to be no more valid when made on the basis of variables uniquely related to airmen effectiveness than when made on the basis of variables uniquely related to non-airmen effectiveness. The conclusion to be drawn from this finding is that membership in the group of aviation specialties is not a moderator of effectiveness predictions. Indeed, it is not even a unique contributor to effectiveness predictions.

The above finding is possibly explainable on the basis of the heterogeneity of duties performed by airmen and the diversity of physical environments in which airmen serve. In other words, although airmen are unique in the sense that they are involved with aircraft, as a group they perform a wide variety of duties which are not unlike those performed by non-aviation personnel. Medical and dental specialists, on the other hand, perform duties and serve in physical environments quite unlike those of other occupational groups. If enlistee occupation can in fact moderate effectiveness predictions, perhaps it would be more readily identifiable among groups such as corpsmen, dental technicians or stewards.

The findings of this study would also suggest that airmen have a higher rate of military effectiveness than non-airmen, not because of their occupational specialty nor because of the environment in which they serve, but because they are selected on the basis of those characteristics which are predictive of successful adaptation and performance (GCT, ARI, MECH, etc.). Were they to serve in non-aviation specialties, they would also have rates of effectiveness higher than the average enlistee.

The results of this study should probably be interpreted with some caution. The characteristics of enlistees who have entered the Navy since 1965 are markedly different from those of enlistees who entered service at the time the data were collected for this study. For example, sailors who have only recently enlisted have higher mean basic battery scores and have gone further in school than those personnel who entered service in 1960. As a result, the rate of military effectiveness of enlistees presently serving in their first enlistments is probably considerably higher than it was five to ten years ago.

Summary

Two groups of enlistees (airmen and non-airmen, totaling 10,369 subjects) who entered the naval service in 1960 were compared on the basis of biographical data, cognitive test scores, recruit training performance, and fleet effectiveness during their first enlistments. Formulae were derived for predicting effectiveness for both groups separately in order to ascertain whether occupational assignment might have a moderating effect upon the validities obtained. The major findings were these:

(1) Airmen have a significantly higher rate of effectiveness than non-airmen, although the difference between the groups is not large.

(2) Reenlisteent rates and the percentage of subjects attending service schools are approximately the same for the two groups.

(3) As a group, airmen possess higher cognitive abilities than non-airmen and more frequently give a history of prior military service.

(4) Assignment to the aviation specialty does not have the effect of moderating predictions of military effectiveness.

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13. ABSTRACT

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